

## The Big Train Project Status Report (Part 106)

This month's article is about making multiple matching items and how to use fixtures to help to consistently replicate each item. The interior of the tavern to be located in the Fox Theater Building in EnterTRAINment Junction's Middle Period city needed bar stools, and it was determined that about twenty-four stools would be the right number. A test piece was created which would act as the model for the follow-on "production run" (Figure 1).

The seat measures  $\frac{3}{4}$  inches square by  $\frac{3}{16}$  inches thick. The legs are approximately  $\frac{1}{16}$  inch square and 1 and  $\frac{1}{8}$  inch long. When assembled, the stool is about 1 and  $\frac{1}{4}$  inch tall, which in  $\frac{1}{24}$ <sup>th</sup> scale is 30 inches.



Figure 1 Bar Stool

Figure 2 shows the materials used: craft sticks and several pieces of  $\frac{3}{4}$  by  $\frac{3}{16}$  inch balsa wood. The pen is included to give some indication of the sizes of the materials.



Figure 2. Bar Stool Materials

Figure 3 shows a simple fixture which was built from scrap material to help cut the materials for the legs to their appropriate lengths. The parts cut to length are shown to the left of each of the brown rectangles. Note the labeling using pictures of the stool to identify which part is cut in which part of the fixture (it was easier and clearer to use a picture than to describe the parts in words, which could be more easily misinterpreted than the pictures). The fixture for assembling two-leg sets, giving the legs the proper angles and alignment, is third from the right. Its surfaces needed to be waxed with paste wax to prevent errant glue from adhering the assembled set to the fixture. (Several sets were destroyed while being removed from the fixture before the paste wax was used.)



Figure 3. The Cutting and Two-Leg Set Assembly Fixture

Figure 4 shows a complete set of parts for the bar stool – the seat, the upper and lower horizontal leg braces, and the four legs.

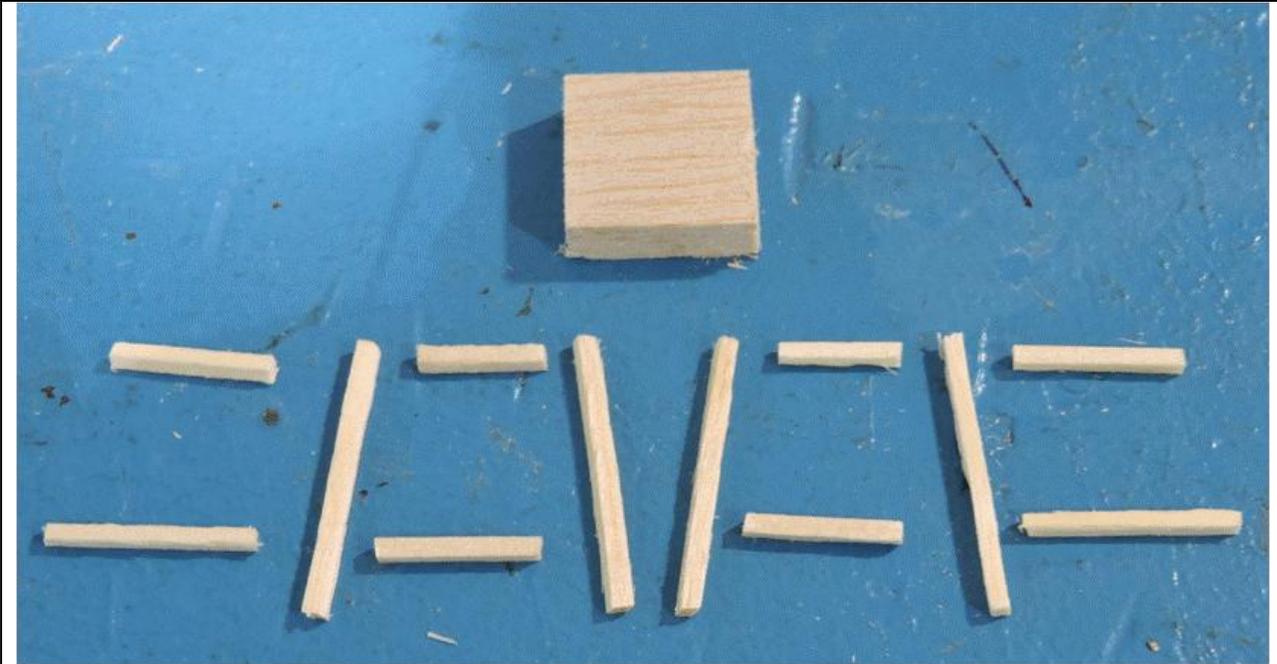


Figure 4. Bar Stool Parts

Balsa wood was selected for the seat, because it is soft enough to be easily shaped into the rounded-edged upholstered top and it would allow easy filing of the bottom to create the central raised block used for locating the two-leg sets assembled on the fixture in Figure 3. Figure 5 shows the fixture which was built to limit the file's cut to the two different widths needed to create the locating block. The fixture provided "guidance" about the orientation of the seat in the fixture using the wood's grain to identify direction. When the filing on one side is complete, with the file cutting on the side of the fixture consistent with the picture of the wood grain, the seat is rotated either 90 or 180 degrees to file another side, again with the file used on the side consistent with the picture of the grain on the re-oriented seat. The finishing nails provide the horizontal barrier to the file's cut, as shown in the right portion of Figure 5. The vertical depth of the cut was controlled by eye with the goal of making the depth even all the way around.

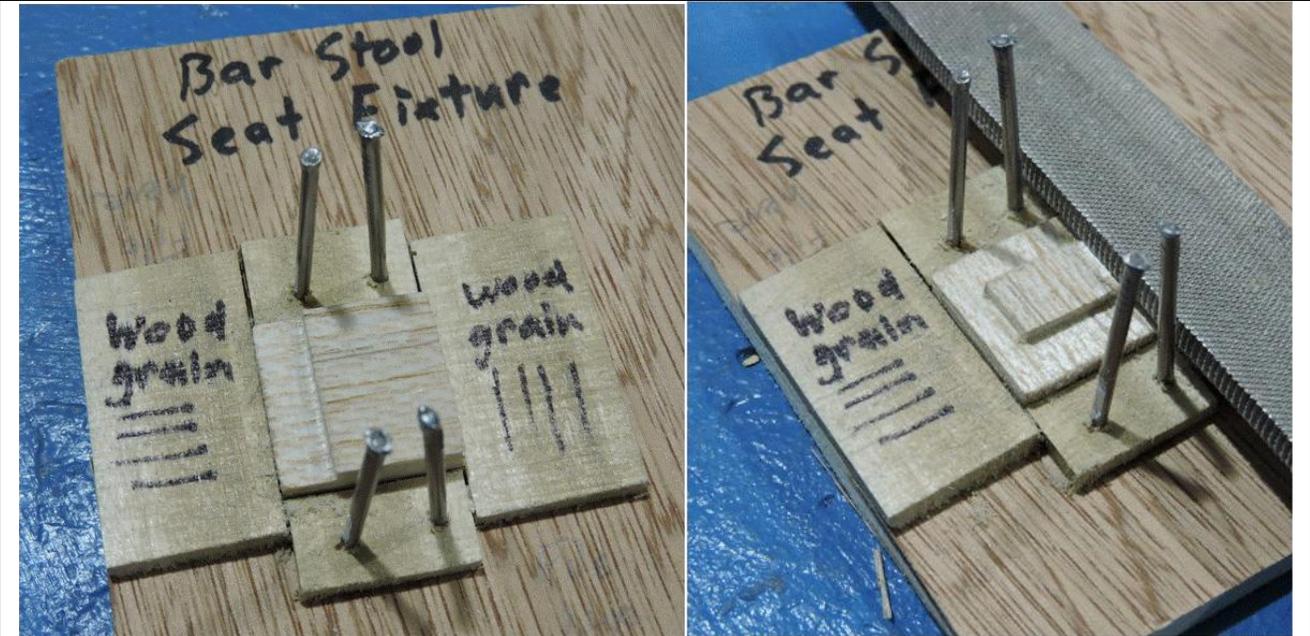


Figure 5. Seat Filing Fixture

Figure 6 shows the fixture for assembling the two-leg sets onto the bottom of the seat at the desired angle. The seat is set upside-down against the shim at the bottom of the fixture, glue is applied to the top of the two-leg set (narrow end) and it is positioned “around” the end of the locating block, the set is then leaned outward until the horizontal leg support touches the fixture’s block. Using medium viscosity cyanoacrylate glue requires this position to be held for about one minute to allow the glue to set. The second leg set is attached in similar fashion on the opposite side of the locating block (the right portion of Figure 6).

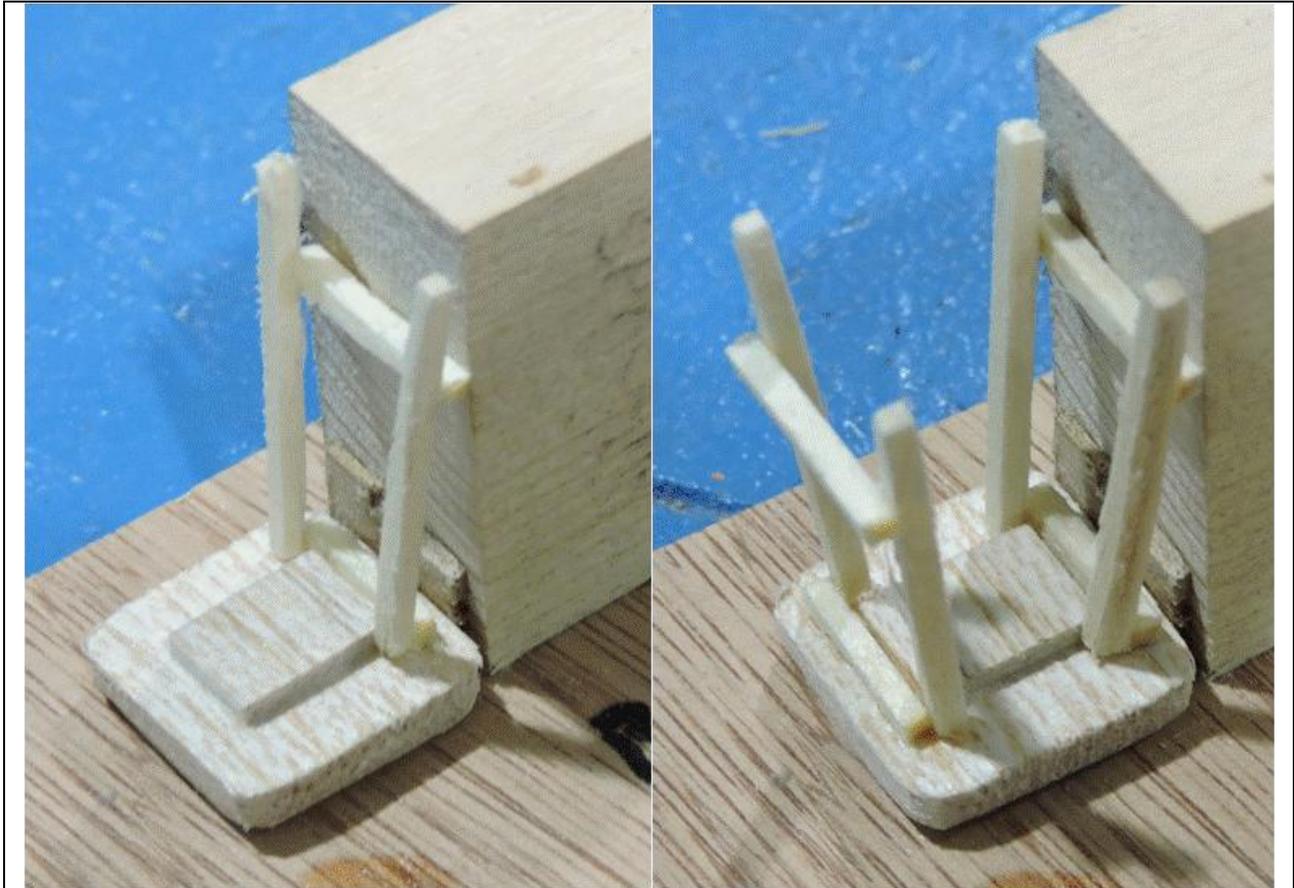


Figure 6. Legs Joined to Seat

Finally, all that's left to do is glue on the remaining upper and lower horizontal leg supports. A gentle sanding to round corners and remove burs finishes the construction (Figure 7). To even up the legs, the stool is set upright on a piece of sandpaper, placed grit side up on a very flat surface, and the stool is moved gently around on the sandpaper until legs are even and the stool can stand on a flat surface without wobbling. Then all that's left is painting the stool to meet the requirements of the décor in which it will be placed.

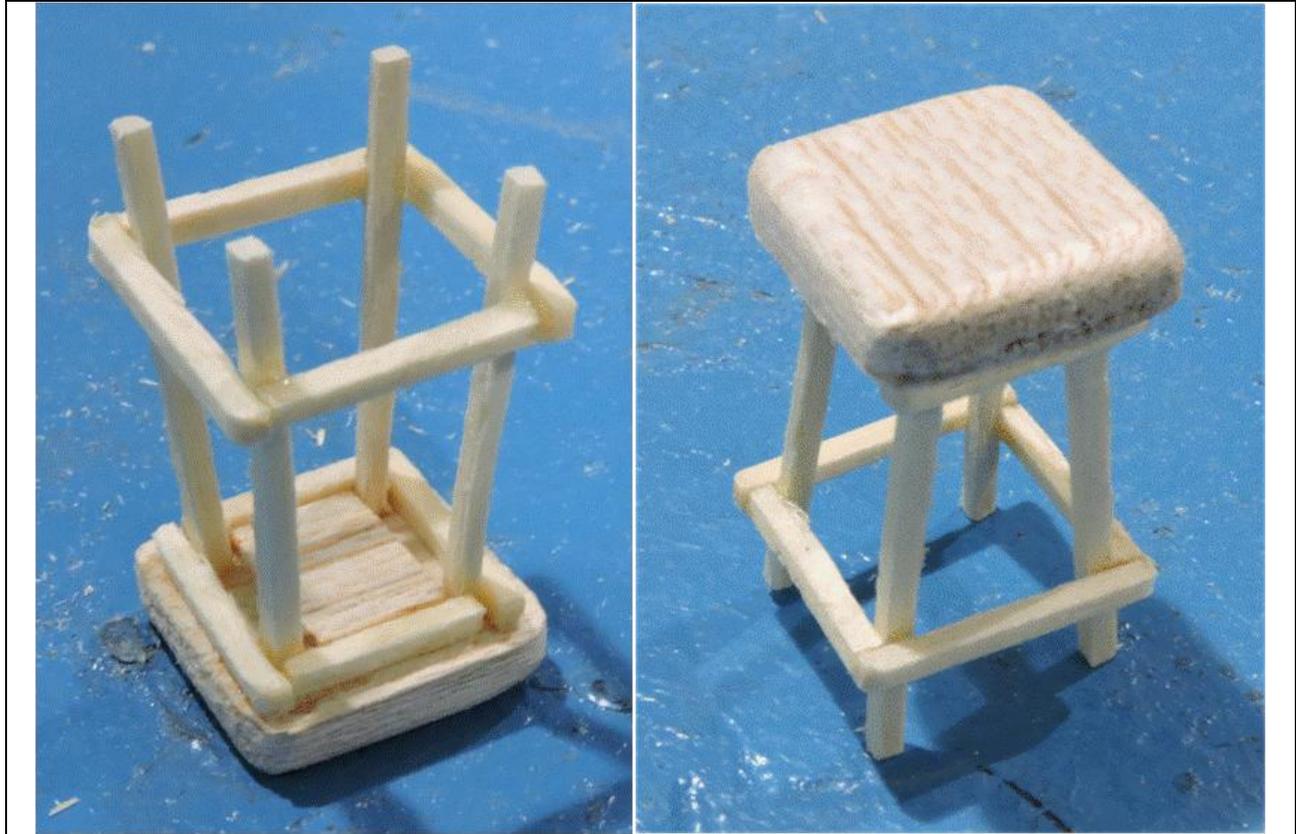


Figure 7. Horizontal Leg Supports in Place

Making multiple copies of the same piece of modeled furniture (or other assembled model item) can be a tedious and time-consuming project; however, with some simple fixtures, the job can be made much easier and much faster. Fixture design takes a bit of creativity, but the essence is to break the modeling job up into the necessary repeatable steps and determine which steps can be assisted by the use of a simple fixture. Label the appropriate parts of the fixture so that users can tell what it's for and, hopefully, how to use it.

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